THE BANK LENDING AND BALANCE SHEET CHANNELS OF MONETARY POLICY

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ABSTRACT

The paper presents a theory-based critique of the bank lending and balance sheet channels that are subsumed under the credit channel of monetary policy transmission. Internationally, extensive empirical work has been done on the credit channel, much of which has been directed at which of the bank lending channel or the balance sheet channel are supported by the data. Results have been mixed, with support for the bank lending channel being found in the United States but not in the Euro area. The lack of consensus in the empirical literature is mirrored by research done in South Africa where mixed views on the existence and relative importance of the two channels have emerged. More recently, it has been argued that the mechanisms underlying the bank lending and balance sheet channels are broadly the same and hence that the data provides support for either or both of these channels. Given the inconclusive empirical results it is argued that the matter should be addressed from a theoretical perspective, taking into account both the mechanisms that underlie the provision of credit by the banking sector and the operation of monetary policy through changes in interest rates.

INTRODUCTION

The paper considers the traditional credit channel and it two components, the bank lending and balance sheet channels. It is argued that, since empirical evidence concerning which, if either, of the two sub-channels is relevant is inconclusive, the theoretical foundations of the two channels require examination. The operation and consistency of these channels is considered against endogenous money theory and it is argued that both the theoretical formulation and empirical testing need to be reformulated.

The paper begins by setting out the traditional explanation of the credit channel and the changes that that have been made over time. An overview of the empirical evidence in the United States, Europe and South Africa is presented. The paper is concluded by considering the relevance of these channels in the context of the theory of endogenous money.

THE CREDIT CHANNEL

Monetary policy has, as argued by Mishkin (1995), increasingly become the centre of macroeconomic policymaking, thus requiring an understanding of the channels through which policy initiatives are transmitted to the economy. The Keynesian *interest rate channel*, including expenditure by both firms and households (on durable goods) has endured as a standard feature of the transmission mechanism in the literature. Bernanke and Gertler (1995), however, drew attention to growing dissatisfaction with the "conventional stories" of how interest rates were meant to affect expenditure on long-lived assets. This dissatisfaction led to the development of the *credit channel;* the theoretical basis of the *traditional* credit channel, which operates through two highly interlinked sub channels, the *bank lending* and *balance sheet channels*, is described by Mishkin (1995) as follows.

The *bank lending channel* is founded on the special role that banks play in the financial system by dealing with borrowers (particularly small firms and households) for whom asymmetric information problems are more severe. In terms of this channel, a monetary contraction which is associated with a loss of reserves and hence deposits will mean that fewer loans can be funded and hence that the supply of loans will be reduced. Schematically, the effect is

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$$\downarrow M \rightarrow \downarrow \text{bank deposits} \rightarrow \downarrow \text{bank loans} \rightarrow \downarrow I \rightarrow \downarrow Y$$

The effects of the *balance sheet channel* are felt through the impact of net worth on business firms; in effect, lower net worth means that less collateral is available to lenders and the losses from adverse selection are accordingly higher. Further, with business owners having a lower equity stake in their firms, moral hazard problems become more severe. Both of these problems would lead to a decrease in lending and thus a decline in interest-sensitive spending. This effect is summarised in the following schematic:

$$\downarrow M \rightarrow \downarrow \text{equity prices} \rightarrow \uparrow \text{asymmetric information problems} \rightarrow \downarrow \text{lending} \rightarrow \downarrow I \rightarrow \downarrow Y$$

A monetary contraction with higher interest rates would have a further negative effect on firms' balance sheets because of a reduction in cash flow. This provides the following additional schematic for the balance sheet channel:

$$\downarrow M \rightarrow \uparrow i \rightarrow \downarrow \text{cash flow} \rightarrow \uparrow \text{asymmetric information problems} \rightarrow \downarrow \text{lending} \rightarrow \downarrow I \rightarrow \downarrow Y$$

Bernanke (2007) relates the traditional balance sheet channel to the *financial accelerator theory* developed by Bernanke and Gertler (1989)[3], a key concept of which was the *external finance premium (EFP)*. The EFP is defined as the difference between the cost to the borrower of raising external finance and the opportunity cost of using internally generated funds; the EFP would represent the costs of evaluation and monitoring borne by the banks and passed on to borrowers. The external finance premium varies inversely with the strength of borrower's balance sheets; this means that borrowers with healthy balance sheets and large amounts of collateral pay a lower premium for external finance compared to borrowers with relatively illiquid balance sheets and small amounts of collateral. Accordingly, unless external funding is fully collateralized, it is always more expensive than internal financing (Bernanke, Gertler and Gilchrest, 1996:2). This inverse relationship between borrowers' net worth and the external finance premium creates a channel that amplifies small shocks to the economy. A positive shock will increase productivity, raise cash flows and improve firms' balance sheets. This in turn reduces the banks' monitoring costs - firms with strong balance sheets have more incentive to make good investment decisions in order to ensure the continued success of their businesses - and lowers the external finance premium for these firms. The lower external finance premium increases firm's investment spending, thereby promoting further expansion and increasing net worth. This results in a further reduction of the external finance premium and ultimately a magnified increase in investment and output.

A monetary contraction and increased interest rates would affect the strength of potential borrowers' balance sheets through changes to asset values and cash flows, in turn affecting their creditworthiness and the EFP faced by these borrowers. The increased cost of credit (by more than the change in risk-free interest rates) would intensify the policy action.

In the light of developments in the banking and financial markets since the 1960's and 1970's, Bernanke (2007) further argues that (at least in the United States) the traditional bank lending channel was unlikely to be quantitatively important and proposed a reformulation of this channel. While banks and other financial intermediaries no longer rely solely on (insured) deposits for funding, other sources are likely to be more expensive; this arises from an EFP for banks that reflects perceptions of their creditworthiness and varies inversely with their financial strength. The EFP with which the banks are burdened is presumably then incorporated into the cost and availability of funds to potential borrowers. In contrast to the traditional bank lending view, Stein (1998:468-473) develops a model in which the management of bank liabilities (and not bank assets) plays an important role in monetary transmission. In this model, banks hold two assets (loans and reserves) and two liabilities (wholesale market liabilities and insured deposits). It is argued that, as a result of individual investor's incomplete information regarding the value of bank's assets, financial intermediaries may face adverse selection problems. This factor is the used to distinguish between small banks that are unable to gain access to wholesale liabilities and as such, rely solely on deposits to fund their lending activities, and large banks that are able to gain additional funding

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[3] See also Angelopoulos and Gibson (2007:8) who regard this as the foundation upon which literature on balance sheet channel has been developed.

from the wholesale market. Although Stein acknowledges the amplifying effects of the bank lending channel, it is argued that this effect is limited to small banks that have little or no access to wholesale markets. Any disturbances to the deposits of these small banks impacts on their ability to supply credit (Milne and Wood, 2009:10-11). More recently, the reduction in bank deposits has been argued to be the result of portfolio rebalancing by households. For example, Ehrmann *et al* (2001) and Kishan and Opiela (2000) regard a monetary contraction as leading to a decrease in the relative yield on bank deposits and, as a result, the desired quantity of bank deposits held by households is reduced. The common element in these interpretations is that changes in bank deposits are seen as the driving force behind bank loans[4].

Reformulation of the bank lending channel to include an EFP borne by the banks that is similar to that paid by other borrowers "unifies the … (balance sheet and bank lending channels) … as the central mechanism of both is seen to be the external finance premium and its relationship to borrowers' balance sheets. The only difference (lies in the fact) that financial intermediaries are the relevant borrowers in the theory of the (bank lending channel)" (Bernanke, 2007:3). Disyatat (2010) concurs and proposes a model that is argued to be more consistent with recent developments in the financial system.

EMPIRICAL EVIDENCE: THE BANK LENDING CHANNEL OF MONETARY POLICY

Empirical evidence on the existence of a bank lending channel has yielded mixed results in both the United States and Europe. Early literature on the topic originates with Bernanke and Blinders (1988) where the demand for and supply of bank loans was modelled. The model was used to estimate credit and money equations evidence in support of a supply driven bank lending channel in the Unites States was found. Bernanke and Blinder (1992) examine how informative the federal fund rate is in forecasting changes in real macroeconomic variables. It was found that the federal fund rate recorded movements in bank reserves and was thus a good indicator of the impact of monetary policy. This conclusion supported earlier findings and provided evidence in support of a supply driven bank lending channel. Kashyap, Stein and Wilcox (1993) and Morgan (1998) reached similar conclusions in an investigation into credit effects in the Unites States. Using contractual differences between commercial banks, Morgan (1998) found that loans granted under a commitment increase or remain unaffected following a contraction in monetary policy, while loans granted without a commitment decrease. Since this implies a decrease in the supply of loans and not a decline in loan demand, Morgan (1998) interprets his findings as evidence in support of a supply driven bank lending channel in the United States.

Romer and Romer (1990) investigated the presence of a bank lending channel during episodes in which the Federal Reserve made changes to monetary policy. No lags between changes in the money supply and bank lending could be found; the lack of a causal relationship between these variables was regarded as confirmation of a demand driven bank lending channel in the United States. These results suggested that changes in bank lending are, to a large extent, determined by changes in the output level. Disyatat (2011) disputes this and argues that there is no such thing as a demand-driven bank lending channel. With loans regarded as the driving force behind deposits, the bank lending channel operates through the impact of monetary policy on banks' balance sheets and risk perception, implying that these findings are evidence against this channel. King (1986) examined whether bank loans could assist in forecasting movements in aggregate economic activities and found little evidence of the ability of bank loans to predict spending and accordingly that the bank lending channel was insignificant in US monetary policy transmission. Metzer[5] (1995) also rejects the existence of a bank lending channel in the United States and suggests that the balance sheet channel is a more effective transmitter of monetary policy[6]. These mixed outcomes reflect both the lack of consensus on the existence of a bank lending channel in the United States and the inherent difficulty in identifying the individual impact and thus importance of each sub component of the credit channel.

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[4] Disyatat (2010:4) acknowledges this but argues that the emphasis placed on deposits as the catalyst for changes in the supply of bank loans is misplaced; bank loans are in fact the driving force behind bank deposits.

[5] See also Gertler and Gilchrest (1993) and Eichenbaum (1994)

[6] More recent research, such as that done by Carson *et al* (2008), Maechlerr and McDill (2006) and Peek *et al* (2003) has focused on the link between banks' external finance premium and the health of their balance sheets. Evidence of the sensitivity of banks' external finance premium to changes in the strength of their balance sheets was found.

Studies regarding the existence and importance of the bank lending channel in Europe have also been inconclusive, although evidence of a narrow credit channel is stronger in the United States than in Europe. De Bondt (1998) used bank data from the Netherlands, Germany, Belgium, Italy, France and the UK to test for a credit channel in the Euro area, and the results showed that small and large banks respond differently to monetary policy changes. These responses were found to be based on the liquidity of bank's balance sheets, with big banks being associated with a high level of liquidity and smaller banks with a lower level of liquidity. Consequently, due to their illiquid balance sheets, small banks were found to be more responsive to changes in monetary policy. Strong evidence in support of a bank lending channel in the first three counties was found. For Italy and France, evidence of a bank lending channel was found when stances in monetary policy were measured using a monetary index instead of movements in short term interest rates, while no evidence of this mechanism was found in the UK. These findings are in line with Disyatat's (2011) proposition that the health of banks' balance sheets and their perception of risk form a pertinent channel for the propagation of monetary policy shocks.

In a similar investigation into the existence of a bank lending channel in Europe, Erhamann *et al* (2001) conclude that this channel does not operate in Europe, the results demonstrating that changes in monetary policy have no impact on bank's credit extension and, as such, that bank size cannot be used to explain changes in bank lending. Favero, Flabbi and Giavazzi (1999) obtain similar results; information contained in the balance sheets of French, German, Italian and Spanish banks was used to determine their response to monetary policy tightening. Although evidence in support of a credit channel and its importance in the transmission of monetary policy was found, no support for a bank lending channel could be found. Instead, bank loans were found to have an insignificant response to movements in monetary policy.

Peersman (2000) argues that the bank lending channel should not be an important component of monetary policy transmission in developed counties and hence supports Erhamann *et al* (2001), Favero, Flabbi and Giavazzi (1999), Van Ees *et al* (1999) and Kakes, Sturm and Maier's (1999) findings of a limited bank lending channel in Europe. Two reasons are provided for this conclusion. Firstly, the European financial sector is characterized by large banks that have easy access to additional funds and hence can insulate their lending activities from policy induced changes in their reserves. Secondly, increases in securitization and technological innovation in this sector were identified as diminishing the importance of a bank lending channel in the Euro area. Angelino *et al* (2003), on the other hand, do find evidence of a bank lending channel for some of the larger euro countries. In contrast to the US, however, it was found that changes in monetary policy have the same influence on the lending of small and large banks in Europe. Structural characteristics of the European banking sector, such as public ownership and state guarantees, are used to explain this result[7]

In more recent years, studies on the bank lending channel have become increasingly focused on the impact that monetary policy has on banks' lending activities (given their size) and thus their ability to raise external funds. Kashyap, Stein and Wilcox (1993) find that decreases in bank lending following monetary policy contractions compel borrowers to substitute[8] away from bank loans towards commercial paper. This offsetting is interpreted as evidence in support of a bank lending channel. Ohliner and Rudebusch (1996) however, contest this conclusion and argue that the offsetting is not a result of loan supply effects but rather of differences in loan demand. They show that following a monetary contraction, small firms decrease their demand for eternal finance – due to their weak balance sheets and hence their inability to access the commercial paper market – and large firms increase their demand for additional funding. Furthmore, using Gertler and Gilchrest's (1994) argument that large firms typically deal with large banks and small firms with small banks, Peersman (2000) contends that differences in loan demand can also be

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[7] More recent studies have also shown evidence of a bank lending channel in Europe. Gambacorta (2008) uses bank prices in his investigation into a narrow credit channel in Italy and in the process provides an alternative means of distinguishing between loan supply and loan demand. Jimenez *et al* (2009) use information from loan applications and find evidence of this mechanism in Spain.

[8] These results suggest that borrowers who are not solely dependent on banks for financing offset decreases in bank lending by increasing their use of external funding

used to explain Kashyap and Stein's (1995, 2000) results. It was found that, in comparison to large banks, small banks tend to have a greater response to changes in monetary policy. This was attributed to the difficulties faced by smaller banks when attempting to access alternative forms of finance as well as heterogeneity in loan demand between small banks and large banks. These results are thus consistent with the conventional model of the bank lending channel, which predicts illiquid banks to be more sensitive to monetary policy changes than banks with healthy balance sheets. In contrast, Disyatat (2010: 3) argues that greater dependence on market based funding could in fact increase the importance of this mechanism by strengthening the link between monetary policy and the cost of external finance.

EMPIRICAL EVIDENCE: THE BALANCE SHEET CHANNEL

In contrast to the bank lending channel, the broad credit (balance sheet) channel is relatively well established. At the core of the balance sheet channel is the notion that internal and external finance are imperfect substitutes due to information asymmetries that hinder the performance of securities markets (Oliner and Rudesbusch, 2006:8). Such information asymmetries induce an external finance premium which tends to be more severe for small firms than for large firms. Consequently, early studies (Gertler and Hubbard (1988), Bernanke and Gertler (1989) and Stigliz (1992)) into the existence and operation of this mechanism focused on the relationship between liquidity and investment spending. It was found that, in the United States, the conditions of firms' balance sheets have a major influence on their ability to access eternal funds and even more so when their net worth is low. Similarly, Kayshap, Lamont and Stein (1994)[9] find that, subsequent to a monetary contraction, small firms experience difficulty accessing bond markets and as a result, face liquidity constraints that reduce inventory investment. Gertler and Gilchrist (1994) also find evidence of this link between changes in monetary policy and the strength of firms' balance sheets. Shifts in the inventories, sales and short-term debt of small and large firms were analysed and it was shown that, after a monetary tightening, these factors decrease more for smaller firms who experience financing problems. In addition, it was found that monetary policy has a greater effect on small firms when the industry as a whole experiences decelerated growth.

This non-linearity in monetary policy effects was also detected by Oliner and Rudesbusch (1996). In an investigation into a balance sheet channel in the United States, movements in the investment behaviour of small and large firms from the early 1960s to the early 1990s was examined. Large shifts in the relationship between internal finance and investment spending following a monetary shock were found and thus that small firms exhibit a greater response to changes in monetary policy than large firms. As opposed to Bernanke and Gertler (1995) whose evidence of a balance sheet channel in the US is inconclusive, Oliner and Rudesbusch (1996) find strong support of a broad credit channel in this country.

In Europe, Angelopoulou and Gibson (2007) and Bougheas *et al* (2003) reach a similar conclusion regarding the existence of a balance sheet channel in the UK. Angelopoulou and Gibson (2007) use data from UK firms to test the responsiveness of investment to changes in capital flows. The results illustrated that the link between cash flows and investment is strongest during periods of monetary tightening, thus providing support for a broad credit channel in the UK. Erhmann (2000) found that small firms are more sensitive to shifts in monetary policy than large firms, providing further support for a balance sheet channel in Germany. Vermeulen (2000) tests for a balance sheet channel in four European countries and finds that the conditions of firms' balance sheets plays a larger role in explaining investment spending during downturns that upturns.

While the aforementioned research provides evidence of a broad credit channel, the issue of the quantitative importance of the credit channel in the monetary policy transmission mechanism is not addressed. Peersman (2000:27) and Deldola and Lippi (2000) examine the significance of the balance sheet channel at the aggregate level and find that this component makes a substantial contribution to the overall transmission of monetary policy. Peersman (2000:27) also demonstrates that monetary policy is more potent at the industry level during economic downturns than upturns.

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[9] Similar evidence is provided by Gertler and Hubbard (1988)

THE CREDIT CHANNEL IN SOUTH AFRICA

Few studies exist on the credit channel in South Africa and, amongst these, evidence on the credit channel has been mixed. In their 1988 paper, Bernanke and Blinder present a supply driven bank lending channel in which banks' credit extension activities are limited and hence loan supply determined by both supply and demand factors. Literature in South Africa, however, suggests that under the repo rate system loans are demand driven. Ludi and Ground (2006) following a similar approach to that used by Kakes (2000), and test for a supply driven bank lending channel in which a monetary contraction raises the probability of higher earnings and loosens credit limits. This in turn increases loan supply, deposits and ultimately boosts consumption, investment spending and output.

Moreover, Kashyap and Stein (1993: 8) state that in order for a bank lending channel to exist, the central bank must be able to constrain bank lending and thus ensure that banks are dependent on it for additional reserves. Thus, if this condition holds, a contractionary monetary policy will increase the repo rate thereby raising the cost to commercial banks of borrowing from the reserve bank. This discourages banks from engaging in borrowing activities with the central bank and consequently limits their reserves and ability to supply loans

Sichei (2005) employs bank-level data to investigate the existence and importance of a bank lending channel in South Africa and finds that banks with strong balance sheets and thus a high level of liquidity are able to mitigate the effects of monetary tightening. Although opposed to Disyatat's (2011) argument that the effects of monetary policy, with regards to the bank lending channel, cannot be mitigated, these results are consistent with Kishan and Opiela (2000) and Kashyap and Stein's (2000) finding for the US and provide support for a supply driven bank lending channel. Burger (2008) also investigates the credit channel. Using the Johansen co-integrating procedure to estimate a vector error correction model, strong evidence of a bank lending channel in this county was found. Similarly, Lungu (2007) examines the link between loan supply and changes in monetary policy. This research focuses on the SADC region and utilizes bank data to test for a bank lending channel. In general, a bank lending channel was found for all the SADC countries.

This apparent lack of consensus in the theoretical and empirical literature on the existence of the bank lending channel is also mirrored for the balance sheet channel. Indeed, studies conducted by Ludi and Ground (2006), Sichei (2006), Lungu (2007) and Burger (2008) have provided mixed views on the existence and importance of this channel in South Africa's monetary transmission mechanism. Ludi and Ground (2006) find that loans in South Africa are driven by consumer demand and not by bank supply. Moreover, they find evidence in support of a balance sheet channel which, according to De Jager and Smal (2001:9), implies that an increase in the repo rate (which represents a contractionary monetary stance), will affect firm and households' balance sheets. This reduces their creditworthiness and thus their eligibility for bank credit, leading to a decline in consumption, investment and output. Conversely Sichei (2006), Lungu (2007) and Burger (2008) find no such evidence of a broad credit channel in the country.

ENDOGENOUS MONEY AND THE CREDIT CHANNEL

While some reference to the fact that loans create deposits[10] can be found in the literature, the concept of an endogenous money supply does not appear to be formally recognised. This is somewhat surprising since, as Davidson (2006:141) argues, "… it is fair to say that central bankers in the twenty-first century have discarded the exogenous money supply concept and instead explicitly developed monetary policies that are more compatible with Moore's endogenous supply concept". Howells (1995:103-104) further notes a broad agreement in the economics profession that the money supply is endogenous; in essence, the central bank sets the official discount rate and the banks, using that as a base, meet the demand for loans from (qualifying) borrowers. The central bank then supplies the monetary base necessary to validate the loans and "… 'loans create deposits' in a causal sense as well as in a purely accounting sense."

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[10] See, for example, Disyatat (2010)

This, it may be argued, is central to the modelling and testing of the credit channel.[11] Loan applications are initiated on the demand side, but the decision as to whether or not the credit is extended lies with the bank. This will depend to large extent on the borrowers' creditworthiness, which in turn will depend on factors such as the strength of their balance sheets and ability to provide adequate collateral. The decision could also be affected by the position of the banks' own balance sheets, as pointed out by Disyatat (2010). Remembering that loans are taken in order to spend, the effects of changes in interest rates on the factors that determine the spending decision, as well as on the balance sheet position of both borrowers and the banks, need to be taken into account. For example, increased interest rates may aggravate the problems associated with adverse selection and the banks may accordingly decide to ration credit as argued by Stiglitz & Weiss (1981).

To the extent that credit is limited at the instance of the banks, it will thus be for reasons related primarily to the borrowers and not as a result of an insufficiency of funding. This means that testing for the existence of a *bank lending channel* without reference to the financial position of the borrower is misdirected. Indeed, it may be argued that the *balance sheet channel*, through its impact on both the borrowers' decisions to apply for loans and that of the banks in making the decision of whether or not to extend the credit, is the only relevant channel that should be considered.

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[11] For present purposes, areas of disagreement such as those between the *horisontalists* and the *structuralists* (Fontana & Venturino, 2003)*,* and those regarding the mechanisms through which money market equilibrium is attained (Howells, 1995), are not pursued.

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